

## **R&D Suggested by the “Pushing the Envelope” Group**

*Revision A 10/2/96 0825*

### **1. Alternative fuels**

- larger part of DOC possible in future
- environmental policy may result in carbon tax or restrictions

### **2. Lighter materials**

- contributes to benefits in all vehicle classes

### **3. Immunity to high intensity electric fields**

- susceptibility of future systems and data links

### **4. Information security**

- industrial espionage in aerospace
- anti-terrorism for data links and information systems

### **5. Low cost space launch**

- support large growth market in communications, surveillance
- launch on demand
- small payloads (200-500Kg)

### **6. Extremely low noise aircraft (engine and airframe)**

- support large growth in fleet
- allow 24 hour ops
- enable supersonic transport ops from all required airports

### **7. “Extremely low or “no” emission aircraft**

- public demand in a more environmentally critical future
- avoid curtailment or taxation of operations

### **8. Sonic boom reduction**

- permit lucrative flight over land
- open many areas of world to new low travel time options

### **9. Fly-by-light**

- reduced susceptibility to electromagnetic fields
- integration with smart skins
- integrated with power-by-wire for aircraft performance gain

### **10. High speed VTOL**

- offset penalty of “V”
- open new air transportation routes world-wide

### **11. Highly survivable aircraft technologies**

- bomb blast
- deliberate damage
- operational damage
- civil and military

### **12. Very large aircraft**

- large cargo aircraft to allow affordable transport of lower cost items
- large passenger loads to increase efficiency of air traffic system
- Provide critical military deployment

### **13. New Air Traffic Management Concepts**

- Allow each aircraft to operate at or near its maximum efficiency
- Low cost growth to any point on earth
- Very low cost of operations and maintenance
- Allow mix of very different speeds and profiles
- Highly secure information systems
- Enable very high volume operations

### **14. Intermodal Cargo Systems**

- Systems-level design for cargo transportation
- Minimum door-to-door times
- Integrated air and ground systems
- Information systems to permit real-time optimization